

implementations wherein the conversion function is adaptively applied based on one or more parameters that can affect the sensitivity of the sensor data over time.

[0320] Additional methods for processing sensor glucose data are disclosed in copending U.S. Patent Application 10/633,404 filed August 1, 2003 and entitled, "SYSTEM AND METHODS FOR PROCESSING ANALYTE SENSOR DATA," which is incorporated herein by reference in its entirety. In view of the above-described data processing, it should be obvious that improving the accuracy of the data stream will be advantageous for improving output of glucose sensor data. Accordingly, the following description is related to improving data output by decreasing signal artifacts on the raw data stream from the sensor. The data smoothing methods of preferred embodiments can be employed in conjunction with any sensor or monitor measuring levels of an analyte in vivo, wherein the level of the analyte fluctuates over time, including but not limited to such sensors as described in U.S. Patent 6,001,067 to Shults et al.; U.S. Patent Application 2003/0023317 to Brauker et al.; U.S. Patent 6,212,416 to Ward et al.; U.S. Patent 6,119,028 to Schulman et al.; U.S. Patent 6,400,974 to Lesho; U.S. Patent 6,595,919 to Berner et al.; U.S. Patent 6,141,573 to Kurnik et al.; 6,122,536 to Sun et al.; European Patent Application EP 1153571 to Varall et al.; U.S. Patent 6,512,939 to Colvin et al.; U.S. Patent 5,605,152 to Slate et al.; U.S. Patent 4,431,004 to Bessman et al.; U.S. Patent 4,703,756 to Gough et al.; U.S. Patent 6,514,718 to Heller et al.; and U.S. Patent to 5,985,129 to Gough et al., each of which are incorporated in there entirety herein by reference.

#### Signal Artifacts

[0321] Typically, a glucose sensor produces a data stream that is indicative of the glucose concentration of a host, such as described in more detail above. However, it is well known that the above described glucose sensor is only one example of an abundance of glucose sensors that are able to provide raw data output indicative of the concentration of glucose. Thus, it should be understood that the systems and methods described herein, including signal artifacts detection, signal artifacts replacement, and other data processing, can be applied to a data stream obtained from any glucose sensor.

[0322] Raw data streams typically have some amount of "system noise," caused by unwanted electronic or diffusion-related noise that degrades the quality of the signal and

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